

**DEFLECTABLE NEEDLE ASSEMBLY****FIELD OF THE INVENTION**

The field of the present invention is a device for facilitating medical or surgical treatment in humans and animals. Specifically, the present invention provides a deflectable needle system for guiding a fluid or medical instrument to or from a location within the body and a method of use.

**BACKGROUND OF THE INVENTION**

The use of needles in the performance of diagnostic and therapeutic medical procedures is well known in the art. Needles come in various diameters and lengths to provide for parenteral administration of pharmaceutical or physiological therapeutic agents. Needles also provide access to anatomical regions of humans and animals for removal of blood, lymph, synovial fluid, cerebral spinal fluid, pericardial effusions, pleural effusions, vitreous fluid, and similar physiological fluids. Access to most anatomical regions provides a means for specific and enhanced diagnostic and therapeutic efficacy.

However, access to some anatomical regions using present needles is often difficult for the practitioner, or even dangerous to the patient, due to the obscure location of the region. Aside from the possibility of inaccessibility due to anatomic obstructions, along with access to some anatomical regions, using present needle systems, there is the possibility for iatrogenic trauma to the patient due to patient positioning, or due to puncture of a nearby organ during placement of the needle.

Accordingly, there is a need for a needle system which provides access to anatomical sites which are difficult to reach using present needle systems. There is also a need for the system to provide simple and accurate maneuverability during placement of the needle.

**SUMMARY OF THE INVENTION**

The present invention is a needle system which provides access to anatomical sites which may be difficult to access due to obstruction by a penetrable or non-penetrable barrier. The invention can be used to simply and accurately guide a needle to a desired physiological site.

The needle of the present invention is a deflectable needle assembly. The deflectable needle assembly provides for delivering or removing a material at a physiological site, in a human or animal body, when access to the site is obstructed by an obstruction. According to the invention, a non-penetrable obstruction includes a parenchymal organ or other physiological tissue which could be pathologically damaged if penetrated by a needle. The deflectable needle assembly of the invention is a telescoping assembly including a stylet which inserts within the lumen of a catheter which inserts within the lumen of a cannula. All components are preferably rotatable around their axes.

The deflectable needle assembly as well as the individual component cannula, catheter, and stylet each have a proximal and distal end. The key aspect of the invention is that the distal end of the catheter is curved. The catheter is manufactured from a material which holds a curved shape and when forcibly straightened can return to its curved shape. Such materials for manufacture include elastic and super-elastic compounds, for example, nickel titanium (NiTi). In addition, the components of the deflectable needle system may be manufactured from a material which may or may not cause artifact on images created by MRI, x-ray, and ultrasonic images.

The proximal end of the needle assembly as well as each of the components may also include a handle. A handle of the invention provides for holding or manipulation of the deflectable needle system during use. A handle on the catheter or cannula may include an egress or ingress channel for dispensing or removing fluid through the needle assembly.

The proximal handle of the deflectable needle assembly may also include a mechanism to prevent the catheter from sliding proximally or distally within the lumen of the cannula. The proximal handle assembly may also include a mechanism to inhibit fluid leakage at the proximal end of the deflectable needle assembly. In a preferred embodiment, a single unit performs both functions.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a view of one embodiment of a deflectable needle assembly of the invention.

FIG. 2 is a view of the embodiment of a deflectable needle assembly of FIG. 1 arranged for penetration into a penetrable physiological barrier by proximal retraction of the catheter within the lumen of the cannula.

FIG. 3 is a view of the embodiment of a deflectable needle assembly of FIG. 1, rotated 90° with the beveled edge of the distal tip of the cannula facing the viewer.

FIG. 4 is a cross-sectional view of a deflectable needle assembly of FIG. 1 taken at line B—B of FIGS. 2 and 3.

FIG. 5 is a cross-sectional view of the deflectable needle assembly of FIGS. 2 and 3 taken at line A—A.

FIG. 6 shows a preferred embodiment of a deflectable needle assembly of the invention with the curved distal end of the catheter retracted proximally.

FIG. 7 shows the same preferred assembly of FIG. 6 however, the catheter is protracted distally in the cannula.

FIG. 8 is a cross-sectional view of the deflectable needle assembly of FIG. 7, taken at line C—C of FIG. 7.

FIG. 9 is a longitudinal cross section of a slidable stopper and cap assembly of the proximal end of a deflectable needle assembly of the invention.

FIG. 10 is a close-up longitudinal cross section of a cap for preventing leakage of fluid at the proximal end of a deflectable needle assembly.

**DETAILED DESCRIPTION OF THE INVENTION**

The present invention provides a deflectable needle assembly for delivering or removing a fluid or guiding an instrument to a physiological site in a human or animal body. The invention claims priority to German Patent Application P 44 40 346.1 which is incorporated herein by reference.

It will be noted that in several places throughout the specification, guidance is provided through lists of examples. In each instance, the recited list serves only as a representative group. It is not meant, however, that the list is exclusive.

A needle assembly of the invention is a tubular, telescoping assembly which can penetrate a penetrable physiological barrier and can be used to transport a fluid or guide a medical instrument to, or from, a physiological location beyond the barrier penetrated. As will be described below, the assembly of the invention can incorporate the telescoping technology disclosed in German Patent Application DE 42 23 897 A1 which is also incorporated herein by reference. Preferably, the needle assembly can penetrate a penetrable physiological